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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/042,624	01/09/2002	Stefano Gliozzi	GB920010034US1	4377

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EXAMINER	
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ART UNIT	PAPER NUMBER
3623	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/042,624	GLIOZZI ET AL.	
	Examiner	Art Unit	
	Scott L. Jarrett	3623	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 January 2002*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *09 January 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *9/11/06*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This Non-Final Office Action is responsive to Applicant's submission filed January 9, 2002. Currently Claims 1-20 are pending.

Priority

2. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Title

3. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: Air Cargo Yield Management System and Method Utilizing Booking Profiles and Unconstrained Demand.

Abstract

4. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The

disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

The abstract of the disclosure is objected to because it is longer than 150 words. Correction is required. See MPEP § 608.01(b).

Claim Objections

5. Claims 6-7 are objected to because of the following informalities: Claim 6 contains a grammatical error reciting "therebetween" instead of the intended "there between". Appropriate correction is required.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 17 and 18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding Claims 17 and 18 the examiner requests clarification as to the statutory class the applicant is claiming as the invention. For example Claim 17 recites a computer program application (software per se) wherein the claim, which the examiner interpreted as claiming an apparatus (system) does not recite any of the structural elements of the system.

Examiner interpreted the claims to read as a computer implemented method for the purposes of examination.

Examiner suggests applicant's amend the claim(s) to positively receite the intended statutory class, e.g. reciting the system elements, and rewrite the claim(s) in independent form to overcome this rejection.

8. Claims 8-12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding Claims 8-12, Claim 8 recites the limitation "**the** yield parameter" in Claim 1: There is insufficient antecedent basis for this limitation in the claim.

Examiner interpreted the claim to read "**a** yield parameter" for the purposes of examination.

Further regarding Claim 8, Claim 8 recites the limitation "previous instance of **the** flight" in Claim 1. There is insufficient antecedent basis for this limitation in the claim. Examiner interpreted the claim to read "previous instance of **a** flight" (i.e. service) for the purposes of examination.

Claim Rejections - 35 USC § 101

9. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

10. Claims 1-18 and 20 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

The claims, as currently recited, appear to be directed to a compilation of data without any tangible result and are therefore deemed to be non-statutory while the compilation of data may have some real world value (i.e. utility/usefulness) there is no requisite functionality present to satisfy the practical application requirement nor are there any "acts" which transform the data and/or cause a physical transformation to occur outside the computer (i.e. not concrete or tangible) therefore the invention as claimed does not produce a useful, concrete, *and* tangible result.

Merely claiming nonfunctional descriptive material, **i.e.**, abstract ideas, stored in a computer-readable medium, in a computer, on an electromagnetic carrier signal does not make it statutory. See Diamond v. Diehr, 450 U.S. 175, 185-86, 209 USPQ 1, 7-8 (1981) (noting that the claims for an algorithm in Benson were unpatentable as abstract ideas because "[t]he sole practical application of the algorithm was in connection with the programming of a general purpose computer."). Such a result would exalt form over substance. In re Sarkar, 588 F.2d 1330, 1333, 200 USPQ 132, 137 (CCPA 1978) ("[E]ach invention must be evaluated as claimed; yet semantogenic considerations preclude a determination based solely on words appearing in the claims. In the final

analysis under 101, the claimed invention, as a whole, must be evaluated for what it is.") (Abele, 684 F.2d 902, 907, 214 USPQ 682, 687(CCPA 1982)). See also In re Johnson, 589 F.2d 1070, 1077, 200 USPQ 199, 206 (CCPA 1978) ("form of the claim is often an exercise in drafting"). Thus, nonstatutory music is not a computer component and it does not become statutory by merely recording it on a compact disk. Protection for this type of work is provided under copyright law.

A claimed invention is deemed to be statutory, if the claimed invention produces a useful, concrete, and tangible result. An invention, which is eligible for patenting under 35 U.S.C. 101, is in the "useful arts" when it is a machine, manufacture, process or composition of matter, which produces a concrete, tangible, and useful result. The fundamental test for patent eligibility is thus to determine whether the claimed invention produces a "use, concrete and tangible result". See AT&T v. Excel Communications Inc., 172 F.3d at 1358, 50 USPQ2dat 1452 and State Street Bank & Trust Co. v. Signature Financial Group, Inc., 149 F.3d at 1373, 47 USPQ2d at 1601 (Fed. Cir. 1998).

The test for practical application as applied by the examiner involves the determination of the following factors"

(a) "Useful" - The Supreme Court in Diamond v. Diehr requires that the examiner look at the claimed invention as a whole and compare any asserted utility with the claimed invention to determine whether the asserted utility is accomplished. Applying utility case law the examiner will note that:

i. the utility need not be expressly recited in the claims, rather it may be inferred.

ii. if the utility is not asserted in the written description, then it must be well established.

(b) "Tangible"-Applying In re Warmerdam, 33 F.3d 1354, 31 USPQ2d 1754 (Fed. Cir. 1994), the examiner will determine whether there is simply a mathematical construct claimed, such as a disembodied data structure and method of making it. If so, the claim involves no more than a manipulation of an abstract idea and therefore, is nonstatutory under 35 U.S.C. 101. In Warmerdam the abstract idea of a data structure became capable of producing a useful result when it was fixed in a tangible medium, which enabled its functionality to be realized.

(c) "Concrete" - Another consideration is whether the invention produces a "concrete" result. Usually, this question arises when a result cannot be assured. An appropriate rejection under 35 U.S.C. 101 should be accompanied by a lack of enablement rejection, because the invention cannot operate as intended without undue experimentation.

In the present case, claims 1-18 and 20 merely recite a method/system for storing and calculating (determining, estimating) a plurality of data related to service capacity, , a compilation of data (i.e., concrete and/or useful). While the invention may be concrete and/or useful, there does not appear to be any tangible result.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

12. Claims 1-15 and 17-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zeni, Richard H., Improved Forecast Accuracy in Revenue Management By Unconstraining Demand Estimates from Censored Data (October 2001).

It is noted that while the Zeni reference, as a whole, postdates the effective filing date of the instant application, the Zeni reference is being relied upon to show the level of ordinary skill in the art at or around the time the invention was made. See Ex parte Erlich, 22 USPQ 1463 (Bd. Pat. App. & Inter. 1992), MPEP 2124.

Generally Zeni teaches the implementation details of a plurality of well-known and commonly used methods (approaches, techniques) for unconstraining constrained/censored data and forecasting demand as part of airline revenue (yield) management systems (Paragraph 2, Page ii; Paragraphs 1-3, Page 2; Paragraphs 1, 3-4, Page 3; Paragraph 2, Page 7; Chapter 1.3, Pages 8-9; Paragraph 1, Page 49; Paragraph 1, Page 247).

Regarding Claims 1 and 17-20 Zeni teaches that yield management systems and methods commonly comprise:

- defining capacity by at least one capacity variable (seats, volume, space, etc.; Paragraph 2, age 4; Paragraphs 1-2, Page 14; Section 1.6, Pages 15-16; Table 1.2; Paragraph 1, Page 73);

- storing a set of historical service profiles (data, information, booking profiles, booking matrix/table) including a value of each capacity variable reserved by each category (fares, fare class, products, product types, buckets, etc.; Booking Profile Method; Paragraph 3, Page 35; Paragraphs 2-4, Page 36; Page 37; Paragraph 1, Page 38; Chapter 2.8.8 Multiplicative Booking Profile Method, Pages 73-77; Tables 2.12, 2.13; Figure 2.7);

- assigning a probability to each previous instance of the service (Expectation-Maximization Algorithm, EM; Page 78; Chapter 2.8.10, Pages 80-83);

- estimating a potential profile/value (future, forecasted demand/supply) of the capacity variable from each historical profile/information according to a current value of the capacity variable reserved for future service instance and corresponding to an unconstrained demand of the capacity variable in the previous instance of the service (Paragraph 3, Page 35; Paragraphs 2-4, Page 36; Page 37; Paragraph 1, Page 38; Chapter 2.8.8 Multiplicative Booking Profile Method, Pages 73-77; Tables 2.12, 2.13; Figure 2.7);

- defining a historical scenario (series of historical profiles) for each previous instance of service including a final potential capacity variable from each potential profile (Booking Profile Method; Paragraph 3, Page 35; Paragraphs 2-4, Page 36; Page 37; Paragraph 1, Page 38; Chapter 2.8.8 Multiplicative Booking Profile Method, Pages 73-77; Tables 2.12, 2.13; Figure 2.7); and

- determining an authorization (approval, allocation, accept/reject reservations/shipments) to allocate the capacity for each capacity variable of each category of the service by applying a stochastic model to the historical scenarios according to the corresponding probabilities (Paragraph 2, Page 4; Paragraphs 2-3, Page 14; Paragraph 3, Page 35; Paragraphs 2-4, Page 36; Page 37; Paragraph 1, Page 38; Chapter 2.8.8 Multiplicative Booking Profile Method, Pages 73-77; Tables 2.12, 2.13; Figure 2.7).

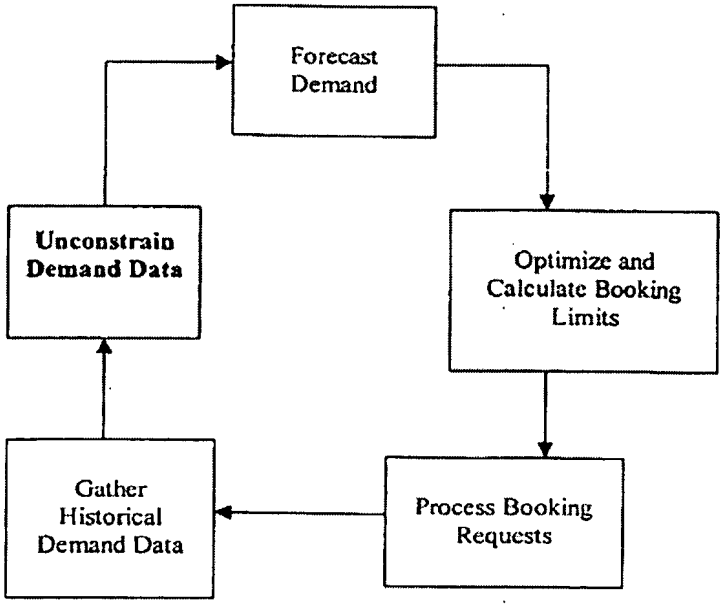

Figure 1.1: Revenue Management Process

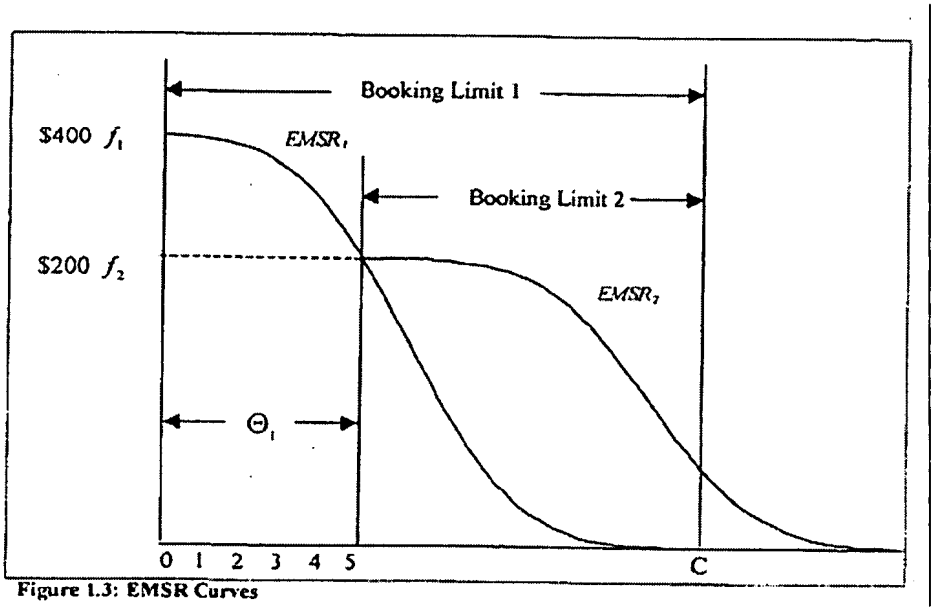

Figure 1.3: EMSR Curves

Week	DP 0	DP 7	DP 14	DP 21	DP 60	DP 90	DP 360
-4	100	90	70	55	25	10	0
-3	97	85	65	50	23	9	0
-2	94	80	60	45	21	8	0
-1	91	77	57	42	19	7	0
0	88	73	54	39	17	6	0
1	--	70	50	35	15	5	0
2	--	--	45	30	13	4	0
3	--	--	--	25	11	3	0

Table 2.1: Bookings Matrix

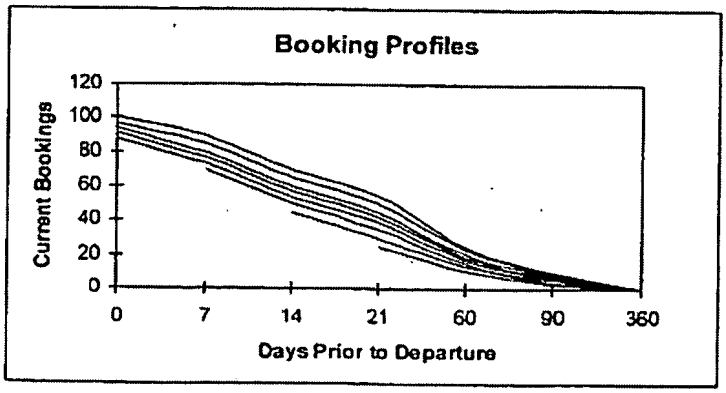

Figure 2.1: Booking Profiles

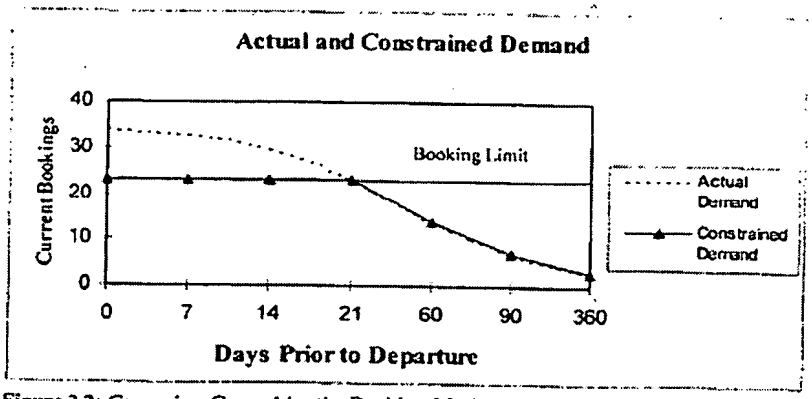

Figure 2.2: Censoring Caused by the Booking Limit

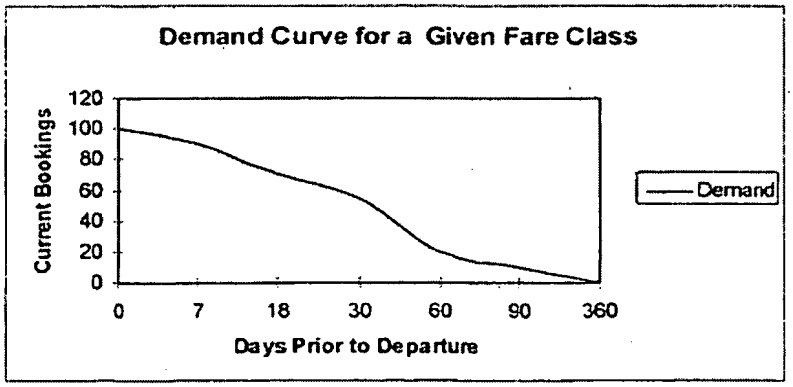

Figure 2.3: Demand Curve

	DP 0	DP 7	DP 18	DP 30	DP 60	DP 90	DP 360
Low Demand	50	47	35	30	17	10	0
Increase	6%	34%	16%	76%	70%	--	--
High Demand	100	94	70	60	34	20	0

Table 2.12: Low and High Demand Histories

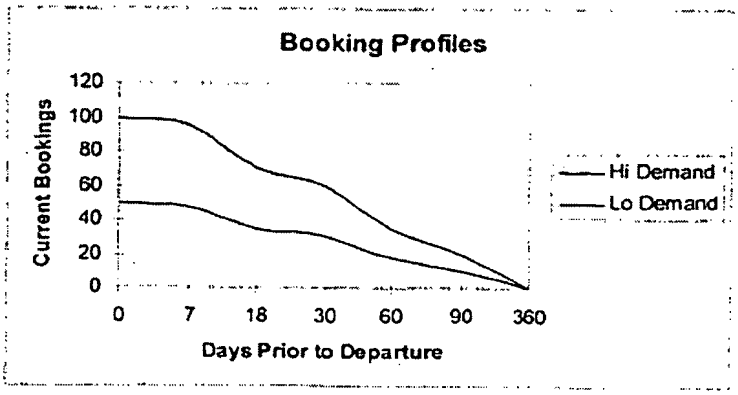

Figure 2.7: Low and High Demand Booking Profiles

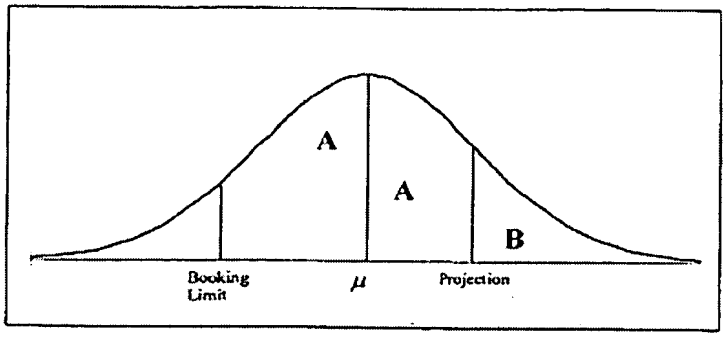

Figure 2.9: Projection Method

Zeni teaches a plurality of known and commonly used methods for unconstraining the inherently censored data of air revenue management systems/methods (Paragraph 5, Page 31; Chapter 2.5, Pages 48-49) including but not limited to Booking Profiles (Chapter 2.8.8, Pages 73-75), Expectation-Maximization Algorithm (Chapter 2.8.9, Pages 78-79) and Projection-Truncation Method (Chapter 2.8.14, Pages 91-95) wherein the unconstrained/uncensored capacity demand data forms the basis for more accurate forecasts (unbiased) of capacity demand utilizing a plurality of well known forecasting approaches/methods (Chapter 2.4 Micro-Level Forecasting, Pages 34-47; Paragraph 1, Page 50; Paragraph 1, Page 49; Figure 1.1).

Zeni does not expressly teach utilizing more than one method for forecasting and/or unconstraining censored capacity demand method as claimed, specifically the Booking Profile Method does not include assigning a probability to the historical booking profiles. However Zeni teaches the well-known application/assignment of probabilities to historical capacity demand data (e.g. EM Algorithm, Projection-Truncation Method;

Paragraphs 1-2, Page 78) to reflect the stochastic/probabilistic nature of capacity demand (Last Paragraph, Page 28; Last Paragraph, 29) as well as to "fill in missing data" (i.e. censored capacity demand data) as is the case with EM Algorithm and Projection-Truncation Method.

It would have been obvious to one skilled in the art at the time of the invention to use combinations of the well-known and commonly used methods for unconstraining censored capacity demand data (complete data methods, Chapter 2.7.1, Pages 53-54) and forecasting potential (future) capacity demand based on the unconstrained historical capacity demand (profiles, data; e.g. utilizing Multiplicative Booking profiles and EM or Project-Truncation methods to unconstrain censored data) in view of the teachings of Zeni wherein the goal of unconstraining censored data is to generate an estimated "demand curve" (Chapter 2.8.1, Pages 57-59; Paragraph 1, Page 55).

Regarding Claim 2 Zeni teaches a plurality of well known yield (revenue) management systems and methods wherein assigning the probability further comprises:

- determining a first coefficient depending on a temporal difference between a previous (historical, past) and future instance of the service (Chapter 2.8.14 Projection Detruncation Method, Pages 91-95; Paragraph 2, Page 91; Paragraph 2, Page 92; Step 1, Pages 93-94);

- determining a second coefficient depending on a space (time) between a current and previous service time (Chapter 2.8.14 Projection Detruncation Method,

Pages 91-95; Paragraph 2, Page 91; Paragraph 2, Page 92; Step 1, Pages 93-94, Step 4, Page 95);

- calculating a weight by combining the first and second coefficients (Chapter 2.8.14 Projection Detruncation Method, Pages 91-95; Paragraph 2, Page 91Step 4, Page 95); and

- calculating the probability by normalizing the weight (Chapter 2.8.14 Projection Detruncation Method, Pages 91-95; Paragraph 2, Page 91Step 4, Page 95).

Regarding Claim 3 Zeni teaches a plurality of commonly used yield management systems and methods wherein calculating the weight further comprises calculating a weighted sum of the first and second coefficients (Chapter 2.8.14 Projection Detruncation Method, Pages 91-95; Paragraph 2, Page 91Step 4, Page 95).

Regarding Claim 4 Zeni teaches a plurality of commonly used yield management method and system wherein the historical and potential profiles (information) including a plurality of snapshots (data) of the reserved capacity variable and the potential capacity variable (Paragraph 2, Page 36; Paragraph 1, Page 57), respectively and wherein estimating the potential profiled further comprises:

- estimating an open coefficient for each period between consecutive snapshots indicative of a time during which the category was open in the period (Paragraph 2, Page 92; Open/Close Indicator Step1, Page 93-94);

- calculating an emphasis value (weight, corrective value, percentage increase, pickup, etc.) for each period as a weighted mean of a gradient in a period of reserved capacity for a category in a subset the historical profiles/information (Paragraph 1, Page 73; Tables 2.12, 2.13);

- estimating a potential gradient (curve, line, coefficient) for each period as a linear interpolation between the gradient for a first value of the opening coefficient indicative of a complete opening of the category and the highest between the gradient and the emphasis value for a second value of the opening coefficient indicative of the complete closure of the category (Paragraphs 2-4, Page 36; Pages 37-38; Chapter 2.8.8, Pages 73-77); and

- constructing a potential profile from a time corresponding to the current time by integration the potential gradients starting from the corresponding current capacity variable (Chapter 2.8.8, Pages 73-77).

While Zeni teaches well known efforts and need to model the opening and closing of capacity allocations as well as the obvious consequence of having the opening/closing of capacity categories (fare classes) between the snapshots/review points (i.e. accepting/rejection reservations; Last Paragraph, Page 80; Paragraph 1, Page 81; Last Paragraph, Page 250) Zeni does not expressly teach estimating an open coefficient for each period between consecutive snapshots indicative of a *percentage* of time during which the category was open in the period as claimed.

Official notice is taken that approximating/estimating unknown intermediate values between two or more known values using a gradient, percentage, line and/or curve are well known in the art (interpolation, approximating missing data).

It would have been obvious to one skilled in the art at the time of the invention that the well-known methods for unconstraining censored demand data including determining if snapshots of capacity demand data contain censored and/or uncensored data based on the opening/closing of capacity categories at the snapshot review points would have benefited from estimating/approximating the amount of time between the snapshots/review points that the capacity category was open/closed using a percentage or other known interpolation technique in view of the teachings of official notice; the resultant system/method further "filling in the missing data" making the unconstrained data set more complete (Zeni: Pages 52-53).

Regarding Claim 5 Zeni teaches a plurality of common yield management systems and methods wherein estimating the potential profile further comprises (discarding negative demand/bias values; Chapter 2.8.3, Pages 63-66):

- verifying whether at least one result of the integration in each snapshot for each category is not strictly positive; and

- setting each potential capacity variable of the category snapshot to zero is the integration is not strictly positive.

Regarding Claim 6 Zeni teaches a plurality of common yield management systems and methods wherein at least one of the capacity variables includes a plurality of capacity variables and the step of estimating potential capacity variables for each category in the potential profile further comprises reconciling the potential capacity variables for each capacity variable for each category in the snapshot to a reference value of a logic relation there between (Paragraph 3, Page 35; Paragraphs 2-4, Page 36; Page 37; Paragraph 1, Page 38; Chapter 2.8.8 Multiplicative Booking Profile Method, Pages 73-77; Tables 2.12, 2.13; Figure 2.7).

Regarding Claim 7 Zeni teaches a plurality of common yield management systems and methods wherein reconciling the potential capacity values further comprises (Projection-Truncation Method, Chapter 2.8.14, Pages 91-95):

- verifying whether the logic relation between the potential capacity variables for the category snapshot is included between a first, defined by the logic expression between reserved capacity variables, and second limits defined by the logic expression between the potential capacity variables; and

- updating the potential capacity variables for the category snapshot to correct the corresponding logic relation to the closest one of the first and second limits.

Regarding Claim 8 Zeni teaches a plurality of common yield management systems and methods further comprising (Paragraph 3, Page 35; Paragraphs 2-4,

Page 36; Page 37; Paragraph 1, Page 38; Chapter 2.8.8 Multiplicative Booking Profile Method, Pages 73-77; Tables 2.12, 2.13; Figure 2.7):

- determining a historical unit value of a yield parameter for each category in each previous instance of the service if available;

- estimating a historical yield parameter for each category in other previous instances of the historical unit yield parameters;

- estimating a potential unit value of a yield parameter for each category in previous instance of a flight (service) from the historical yield parameter; and

- calculating a potential value of the yield parameter for each category in each previous instance of the service multiplying the corresponding potential unit yield parameter by the potential capacity parameter, the potential yield parameter being included in the corresponding historical profile/information.

Regarding Claim 9 Zeni teaches a plurality of common yield management systems and methods wherein estimating each potential unit yield parameter further comprises (Paragraph 3, Page 35; Paragraphs 2-4, Page 36; Page 37; Paragraph 1, Page 38; Chapter 2.8.8 Multiplicative Booking Profile Method, Pages 73-77; Tables 2.12, 2.13; Figure 2.7):

- determining a current unit value of the yield parameter for the corresponding further instance of the service/flight;

- calculating each potential unit yield parameter as a sum of the corresponding historical unit yield parameter and current yield parameter weighted according to a corrective factor (percentage increase).

Regarding Claim 10 Zeni teaches a plurality of common yield management systems and methods wherein calculating the potential unit yield parameter further comprises (Projection-Truncation Method, Chapter 2.8.14, Pages 91-95):

- determining a first coefficient depending on a difference between the current time and a planned occurrence of time for the future service instance;

- determining a second coefficient depending on a increment of at least one potential capacity variable with respect to at least one capacity variable;

- calculating a correction factor by combining the first/second coefficients; and

- calculating the potential yield parameter as a sum of historical yield and current yield parameters weighted according to the corrective factor.

Regarding Claim 11 Zeni teaches a plurality of common yield management systems and methods further comprising:

- calculating a weighted mean value of the potential yield parameter for each capacity variable of each category (Steps 1-3, Page 76); and

- determining a nesting order corresponding to the weighted potential yield parameters (Chapter 1.7.3, Pages 20-21; Chapter 1.6, Pages 15-16; Paragraph 1, Bullet 3, Page 17; Table 1.2).

Regarding Claim 12 Zeni teaches a plurality of common yield management systems and methods wherein determining a nesting order further comprises providing an input nesting order of the categories for each capacity variable (Chapter 1.7.3, Pages 20-21; Chapter 1.6, Pages 15-16; Paragraph 1, Bullet 3, Page 17; Table 1.2).

Zeni does not expressly teach updating each input nesting order by ranking the categories having at least one scenario with each component that is strictly positive.

Official notice is taken the defining nesting orders/hierarchies in airline yield/revenue management systems is well known as is the need to update (revise) nesting orders (virtual nesting) wherein capacity categories capacity with positive demand should be ranked over capacity categories having negative demand.

It would have been obvious to one skilled in the art at the time of the invention that the plurality of revenue/yield management systems and methods as taught by Zeni with their ability to utilize virtual nesting orders for the various capacity categories (fare classes, product types, etc.) would have benefited from ranking the various hierarchical/nested capacity categories such that categories with positive demand are ranked higher/over categories with negative or lower demand wherein ranking from the most demanded to the least demand categories has the well understood effect of selecting/ordering the categories from the most demanded to the least demanded.

Regarding Claim 13 Zeni teaches a plurality of common yield management systems and methods wherein determining authorizations further comprises (Chapter 2/8.14, Pages 91-95):

- providing an aggressiveness parameter indicative of an attitude to the risk (Paragraphs 1-2, Page 91);

- defining a first portion of a target function for calculating the yield parameter by assigned an offered capacity with a nesting policy (Steps 1-4, Pages 93-95);

- defining a second portion of a target function by assigning an offered capacity with an out of nesting policy (Steps 1-4, Pages 93-95);

- defining the target function as a sum of the first/second portions weighted according to the aggressiveness parameter (Paragraphs 1-2, Page 91); and

- calculating the authorizations by optimizing the target function (Steps 1-4, Pages 93-95).

Regarding Claim 14 Zeni teaches a plurality of common yield management systems and methods wherein the step of defining the second portion further comprises defining an independent component of the second portion for each capacity variable (Steps 1-4, Pages 93-95).

Regarding Claim 15 Zeni teaches a plurality of common yield management systems and methods further comprising providing a user-defined scenario with a

corresponding probability and the stochastic model being further applied to the user-defined scenario according to the corresponding probability (Booking Profile Method; Paragraph 3, Page 35; Paragraphs 2-4, Page 36; Page 37; Paragraph 1, Page 38; Chapter 2.8.8 Multiplicative Booking Profile Method, Pages 73-77; Tables 2.12, 2.13; Figure 2.7).

13. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zeni, Richard H., Improved Forecast Accuracy in Revenue Management By Unconstraining Demand Estimates from Censored Data (October 2001) as applied to claims 1-15 and 17-20 above, and further in view of Kasilingam, Air cargo revenue management (1996).

Regarding Claim 16 Zeni does not expressly teach that the intended field of use of plurality of airline revenue management systems/methods includes managing air cargo as claimed.

Kasilingam teach each a yield management system and method wherein the service consists of a cargo flight, the at least one capacity variable consists of a weight and volume and the yield parameter consists of a revenue (Column 1, Paragraph 1, Page 36; Column 2, Paragraph 1, Page 36; Column 2, Last Two Paragraphs, Page 37; Column 1, Paragraph 1, Page 38; Section 5.1 Capacity Forecasting, Pages 39-40; Figure 1) in an analogous art of revenue/yield management for the purposes of forecasting cargo capacity both supply and demand based on "3-dimensions) in order to maximize company profitability/revenues as part of the revenue management system/method (Column 1, Paragraph 1, Page 36).

More generally Kasilingam teaches the utilization of revenue/yield management techniques to maximize/optimize air cargo revenues/profitability wherein the revenue management system/method includes forecasting the stochastic nature of capacity, both supply (variable tender, variable passenger demand/capacity) and demand (by

market, product type/class) using historical booking profiles and current bookings data, modeling cargo capacity using three capacity variables weight, volume and number of container positions, allotment determination, overbooking, and nesting (Column 1, Last Paragraph, Page 38; Column 2, Paragraphs 1-2, Page 38; Column 1, Paragraphs 1-2, Page 39; Column 2, Paragraphs 1-3, Page 40; Column 1, Paragraphs 2-4, Page 41; Figure 1).

It would have been obvious to one skilled in the art at the time of the invention that the commonly used airline revenue management systems and methods as taught by Zeni would have benefited from being applicable to a plurality of revenue management applications including the managing of air cargo in view of the teachings of Kasilingam; the resultant system/method forecasting cargo capacity both supply and demand based on "3-dimensions) in order to maximize company profitability/revenues as part of the revenue management system/method (Kasilingam: Column 1, Paragraph 1, Page 36).

Examiner's Note

The invention, as disclosed in the instant application, is directed to an air cargo revenue management system and method for maximizing airline revenues using booking profiles and unconstrained cargo capacity supply and demand data. The instant application may disclose patentable subject matter however not all of the disclosed potentially patentable subject matter is recited in the claims. An interview with the examiner may be productive.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Hornick et al., U.S. Patent No. 5,255,184, teach a airline capacity reservation and yield management system and method comprising Expected Margin Seat Revenue (EMSR) having a probabilistic demand model, nested booking limits for different fare classes (categories), determining an authorization to allocate offered capacity (accept/reject reservations), a reservation model for opening/closing fare classes, and a stochastic demand model.

- Talluri, U.S. Patent No. 6,263,315, teach a revenue (yield) management system and method for determining authorizations to allocate offered capacity for a plurality of categories in a future instance of the service (i.e. reservations requests for seat, rooms, volume/weight, etc.).

- Lim et al., U.S. Patent No. 6,804,658, teach a system and method for forecasting airline capacity demand to support decisions to accept or deny requests for

reserving airline capacity (determining authorizations to allocate offered capacity for a plurality of categories in a future instance of the service).

- Benda et al., U.S. Patent No. 6,937,992, teach a yield management system and method for allocating capacity (freight transportation capacity, volume, weight category, cubic capacity, length, cartons, containers, etc.).

- Talluri, U.S. Patent Publication No. 2002/0065699, teach a yield management system and method for determining categories of capacity to offer based on historical and current (transactional) customer data.

- Ott, Swissair Tests Cargo Management System to Stem Declining Yield (1988), teaches the well-known utilization of air cargo revenue management systems and methods wherein the system/method determine an authorization to allocate offered capacity of each capacity variable based on historical customer request data (profiles) including the weight and space occupied by the cargo.

- Bazaraa, Airline Capacity Forecasts Help Shippers Plan More Accurately (1992), teaches American Airlines utilization of an air cargo revenue management system and method comprising storing historical profiles/data (airway bills) for a plurality of past service instances (cargo shipments), a plurality of different capacity categories (buckets, product types), capacity forecasting (demand and supply, weight, volume, distance, equipment type, lift capacity, etc.) and booking control (accept/reject, authorize shipment requests for various buckets/product types) in order to maximize total revenue.

- Brumelle et al., Airline Seat Allocation With Multiple Nested Fare Classes (1993), teaches a system and method for determining booking policies (authorizations to allocate offered capacity for a plurality of categories in a future instance of a service/flight, booking limits, protection levels, etc.) utilizing nested fare classes wherein demand for the service comprises a stochastic model.

- Wickham, Evaluation of Forecasting Techniques for Short-Term Demand from Air Transportation (1995), teaches several well known forecasting methods/techniques used in air capacity revenue/yield management (inventory pricing and control).

- Kasilingam, An Economic Model for Air Cargo Overbook Under Stochastic Capacity (1997), teaches the well-known utilization of airline revenue and yield management systems and methods. Kasilingam further teaches forecasting (estimating) future capacity demand taking into account the stochastic nature of capacity demand (variability in terms of weight, volume, cancellations, no-shows, etc.).

- Adyanthaya, Revenue Management: the Black Art (1998), teaches the well known utilization of advanced mathematical and statistical techniques applied to airline revenue management including air cargo capacity that accounts for the volume, weight and density of transported objects as well as stacking and other logistical considerations.

- Yields Making Cargo Pay (1998), teach the utilization of revenue/yield management systems/methods in the air cargo industry comprising determining overbooking levels (limits) for a plurality of nested service categories, storing a plurality of historical data (waybill history), forecasting capacity demand by flight/product,

unconstraining capacity demand and weighting (prioritizing, ranking) customers (demand) according to user-defined values.

- Williams, Revenue Management (1999), teach the well-known need as well as well known methods/approaches for allocating capacity (seats, air cargo capacity) wherein censored/constrained/truncated demand data is unconstrained and the stochastic/uncertain nature of demand is modeled/forecasted using distributions whose parameters are estimated from historical data/profiles.

- Sobie, Freight's Yield Signs (2000), teach several commercial air cargo revenue management systems/methods which determine authorizations to allocated air cargo capacity based at least partially on snapshots of historical cargo demand data having weight and volume dimensions (capacity variable).

- Zaki, Forecasting for Airline Revenue Management (2000), teaches the importance of demand (capacity) forecasting in airline revenue management systems/methods wherein airline revenue management systems/method typically determine optimal capacity mix (product) and accept/reject capacity requests based on capacity forecasts (potential profile) generated from historical booking profiles (booking pattern, fractional build curve) wherein the demand data needs to be untruncated/unconstrained.

- van Ryzin et al., Revenue Management Without Forecasting or Optimization (2000), teaches a revenue management system and method comprising determining capacity (seat) protection levels (booking limits, authorizations), for nested classes,

based on forecasted capacity demand using uncensored historical data and stochastic demand models.

- Zeni, Improving Forecast Accuracy by Unconstraining Censored Demand Data (2001), teaches a plurality of well-known methods/techniques for unconstraining capacity demand data in the airline industry including but not limited to the Booking Profile, EM Algorithm and Projection-Detruncation methods.

- Karaesmen, Three Essays on Revenue Management (2001), teach an air cargo revenue management system and method comprising multiple reservation classes, volume and weight capacity variables, determining an authorization to allocate offered capacity (accept/reject shipment requests) in order to optimize/maximize revenue, and forecasting future capacity demand.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Scott L. Jarrett whose telephone number is (571) 272-7033. The examiner can normally be reached on Monday-Friday, 8:00AM - 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hafiz Tariq can be reached on (571) 272-6729. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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May 1, 2007